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Ngo et al.

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(54) **CENTRALIZED DATA STORE FOR PROVIDING ALL PLACE-RELATED DATA TO APPLICATIONS ON A MOBILE DEVICE**

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(73) Assignee: **BlackBerry Limited**, Waterloo (CA)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

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(51) **Int. Cl.**
H04W 24/00 (2009.01)
H04W 4/02 (2009.01)

(52) **U.S. Cl.**
CPC ***H04W 4/02*** (2013.01)

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CPC H04W 4/02
USPC 455/456.3, 456.1, 456.2, 456.5, 456.6, 455/457, 414.2; 705/7.34, 14.57, 14.58, 705/26.9, 346; 379/207.12
See application file for complete search history.

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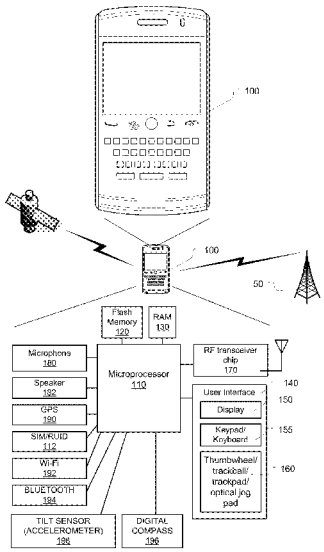
Primary Examiner — Shahriar Behnamian
(74) *Attorney, Agent, or Firm* — Moffat & Co.

(57) **ABSTRACT**

A method of managing place data for a mobile device, the method comprising storing place data for the mobile device in a centralized place data store, the centralized place data store storing location data for each of a plurality of places defined by the mobile device, and in response to place data requests from a plurality of applications executing on the mobile device, providing the place data from the centralized place data store to the plurality of applications.

26 Claims, 17 Drawing Sheets



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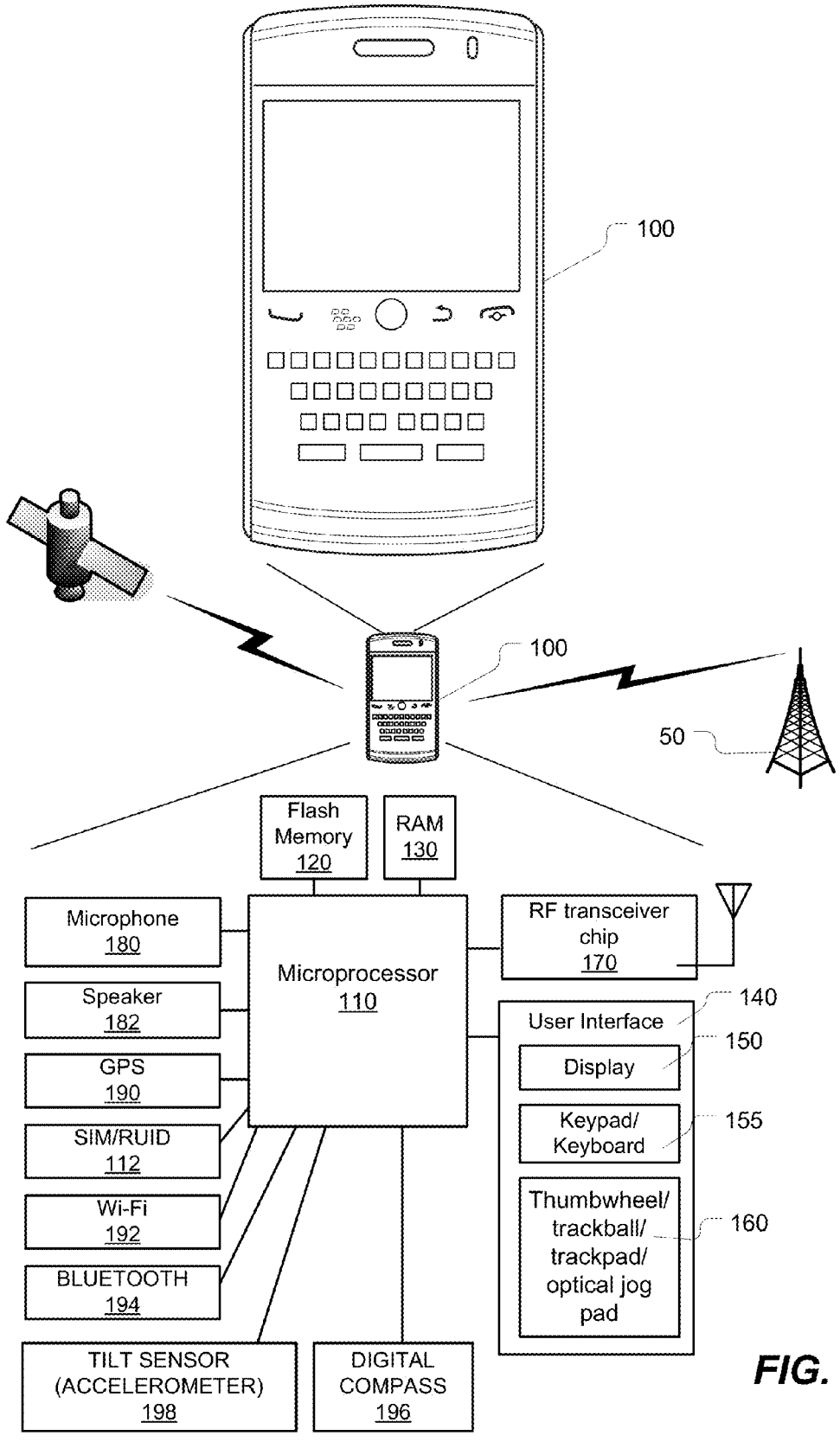
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100
50
Flash Memory 120
RAM 130
Microphone 180
Speaker 182
GPS 190
SIM/RUID 112
Wi-Fi 192
BLUETOOTH 194
Microprocessor 110
RF transceiver chip 170
User Interface
140
150
Display
Keypad/ Keyboard
155
Thumbwheel/ trackball/ trackpad/ optical jog pad
160
TILT SENSOR (ACCELEROMETER) 198
DIGITAL COMPASS 196

FIG. 1

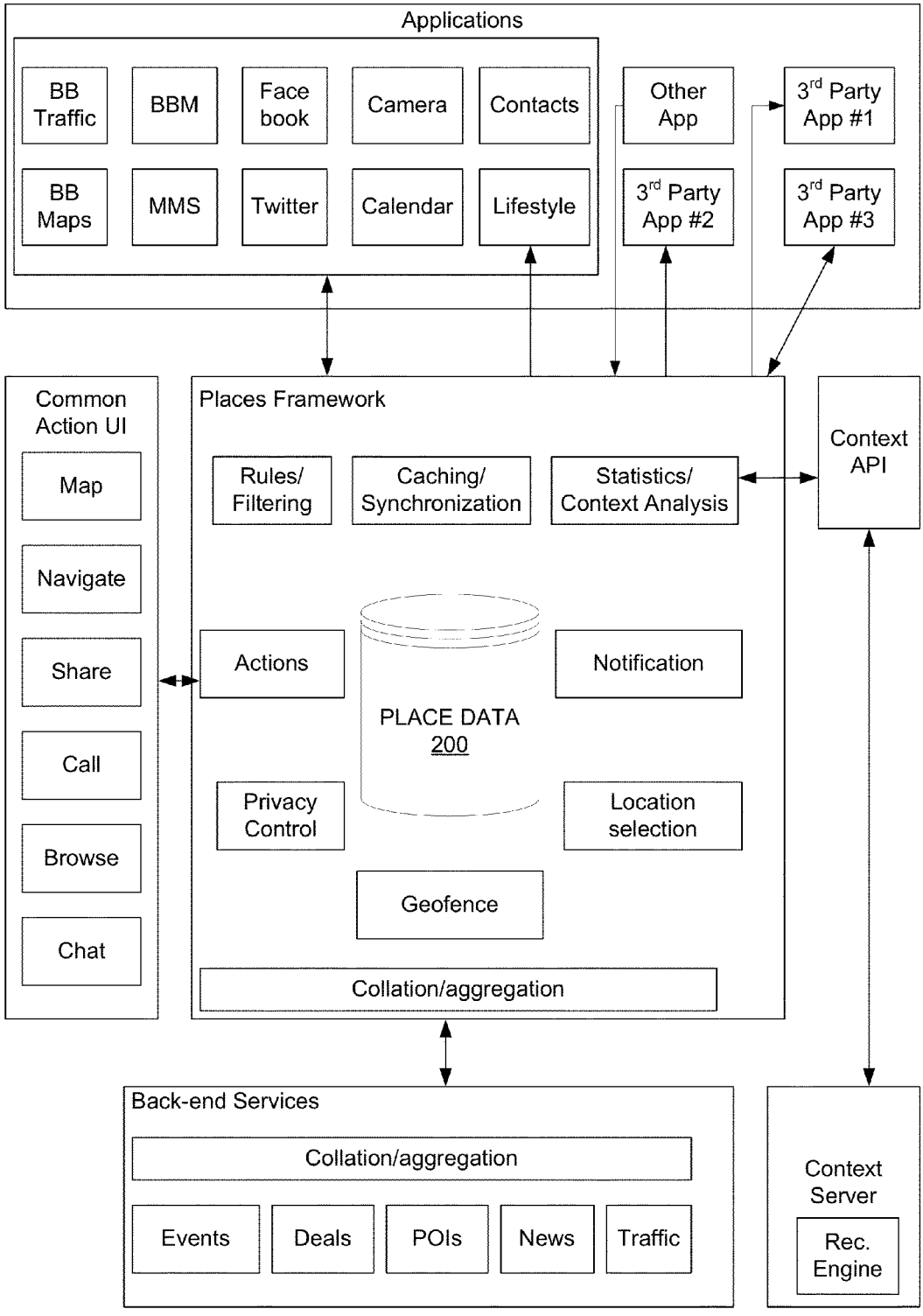
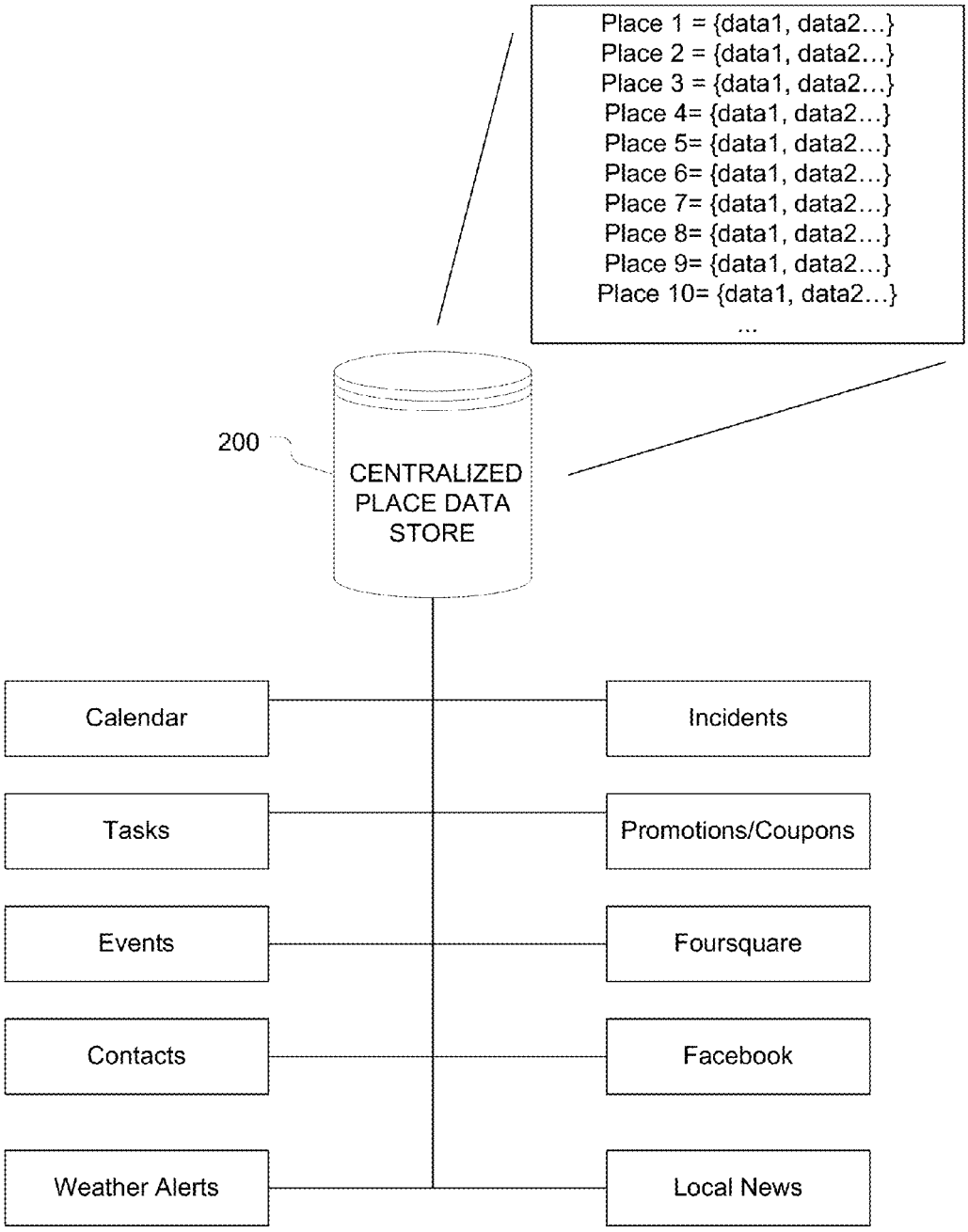

Applications
BB Traffic
BBM
Face book
Camera
Contacts
Other App
3rd Party App #1
BB Maps
MMS
Twitter
Calendar
Lifestyle
3rd Party App #2
3rd Party App #3
Common Action UI
Map
Navigate
Share
Call
Browse
Chat
Places Framework
Rules/ Filtering
Caching/ Synchronization
Statistics/ Context Analysis
Context API
Actions
PLACE DATA 200
Notification
Privacy Control
Location selection
Geofence
Collation/aggregation
Back-end Services
Collation/aggregation
Events
Deals
POIs
News
Traffic
Context Server
Rec. Engine

FIG. 2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Place 2 = {data1, data2...}
Place 3 = {data1, data2...}
Place 4= {data1, data2...}
Place 5= {data1, data2...}
Place 6= {data1, data2...}
Place 7= {data1, data2...}
Place 8= {data1, data2...}
Place 9= {data1, data2...}
Place 10= {data1, data2...}
...
200
CENTRALIZED PLACE DATA STORE
Calendar
Tasks
Events
Contacts
Weather Alerts
Incidents
Promotions/Coupons
Foursquare
Facebook
Local News

FIG. 3

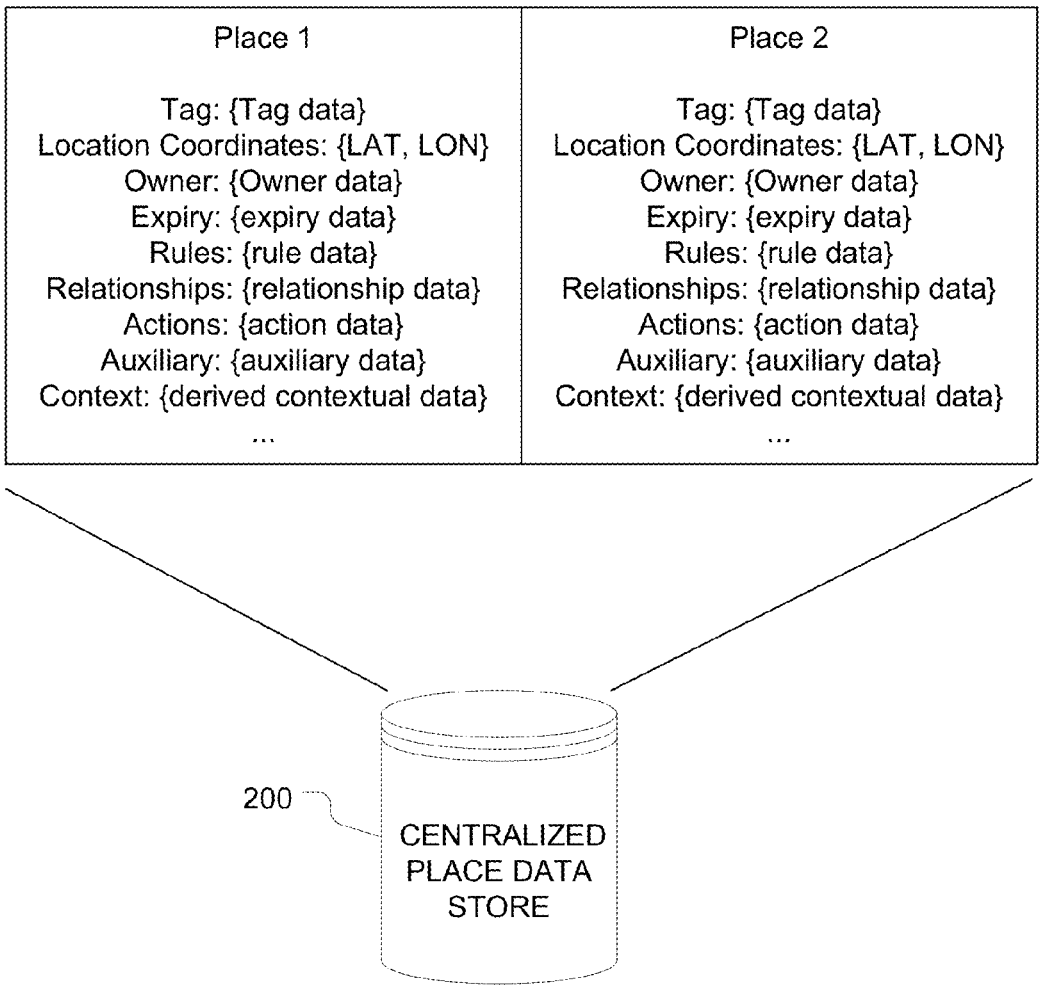
Place 1
Tag: {Tag data}
Location Coordinates: {LAT, LON}
Owner: {Owner data}
Expiry: {expiry data}
Rules: {rule data}
Relationships: {relationship data}
Actions: {action data}
Auxiliary: {auxiliary data}
Context: {derived contextual data}
...
Place 2
Tag: {Tag data}
Location Coordinates: {LAT, LON}
Owner: {Owner data}
Expiry: {expiry data}
Rules: {rule data}
Relationships: {relationship data}
Actions: {action data}
Auxiliary: {auxiliary data}
Context: {derived contextual data}
...
200
CENTRALIZED PLACE DATA STORE

FIG. 4

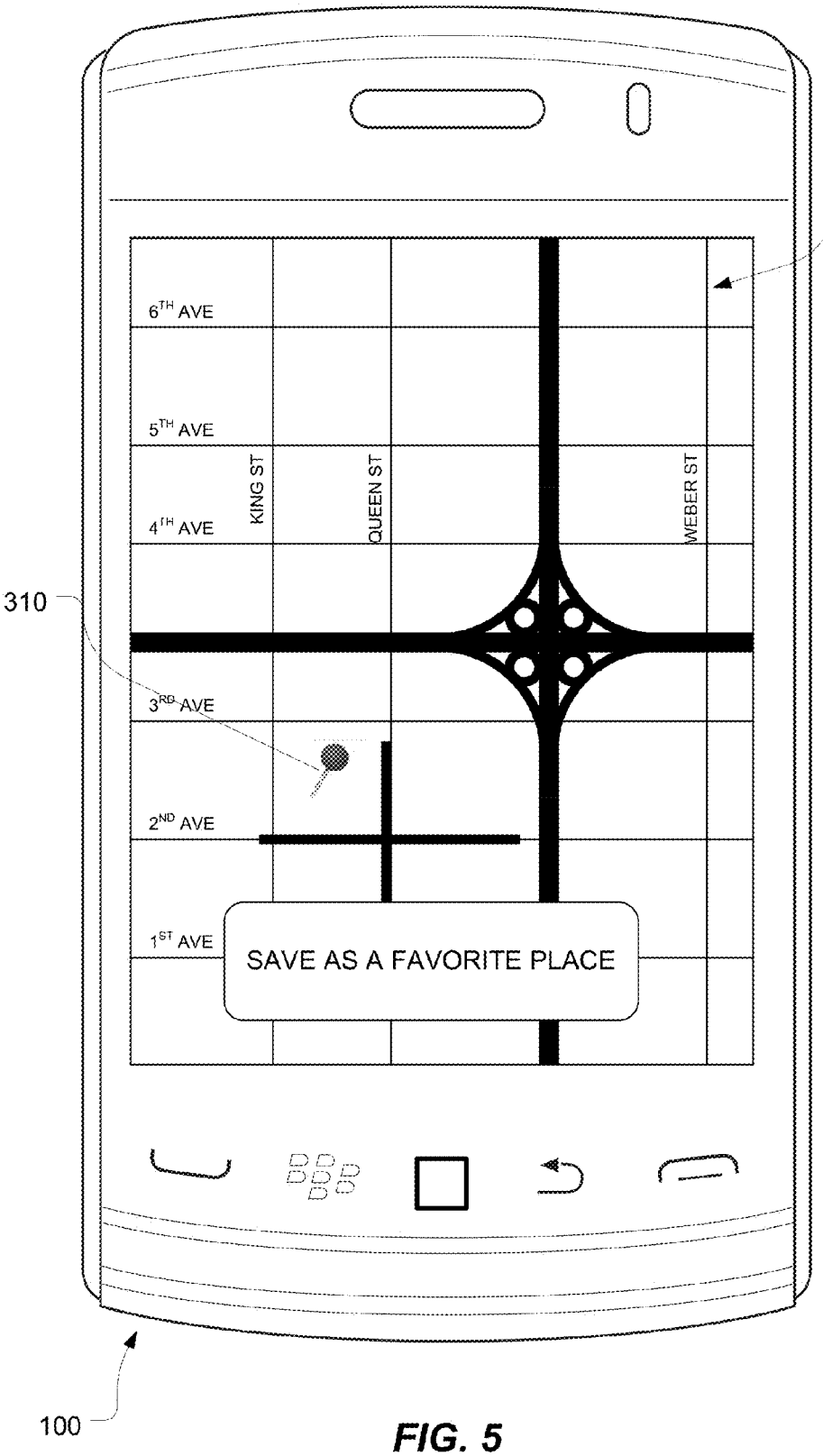
300
310
100
6TH AVE
5TH AVE
4TH AVE
3RD AVE
2ND AVE
1ST AVE
KING ST
QUEEN ST
WEBER ST
SAVE AS A FAVORITE PLACE

FIG. 5

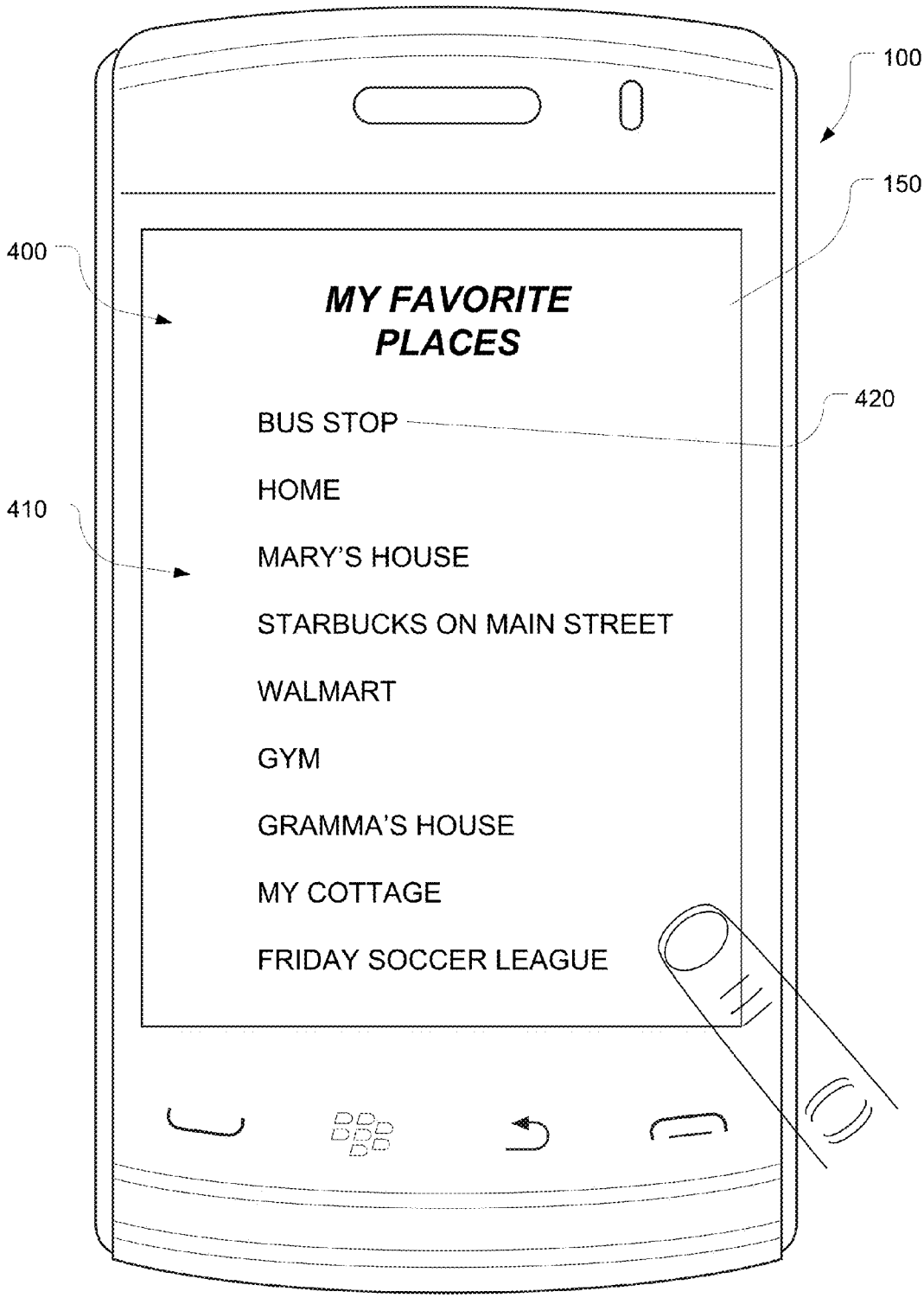
100
150
400
MY FAVORITE PLACES
420
BUS STOP
410
HOME
MARY'S HOUSE
STARBUCKS ON MAIN STREET
WALMART
GYM
GRAMMA'S HOUSE
MY COTTAGE
FRIDAY SOCCER LEAGUE

FIG. 6

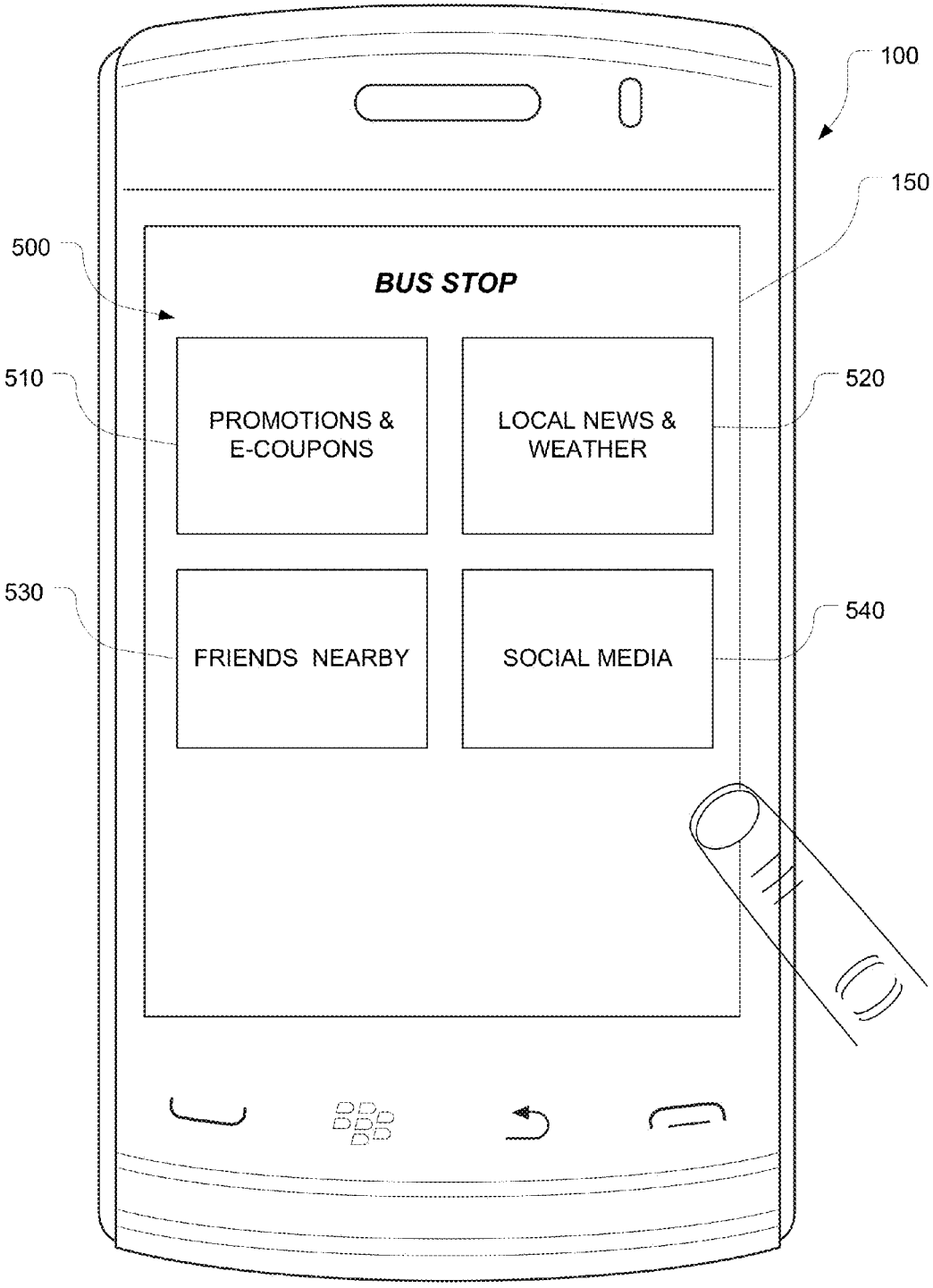
100
150
500
BUS STOP
510
PROMOTIONS & E-COUPONS
520
LOCAL NEWS & WEATHER
530
FRIENDS NEARBY
540
SOCIAL MEDIA

FIG. 7

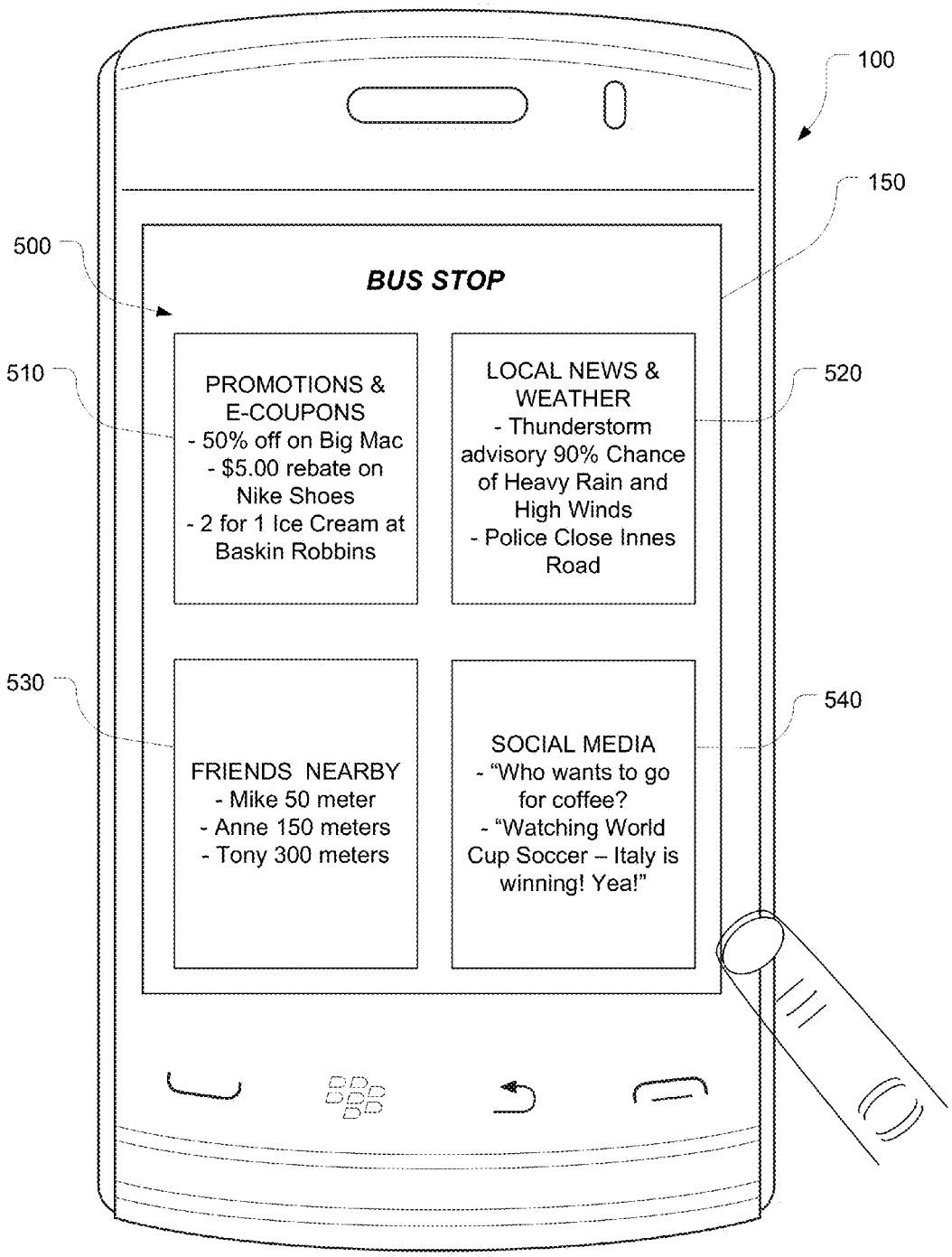
100
150
500
BUS STOP
510
PROMOTIONS & E-COUPONS
- 50% off on Big Mac
- $5.00 rebate on Nike Shoes
- 2 for 1 Ice Cream at Baskin Robbins
520
LOCAL NEWS & WEATHER
- Thunderstorm advisory 90% Chance of Heavy Rain and High Winds
- Police Close Innes Road
530
FRIENDS NEARBY
- Mike 50 meter
- Anne 150 meters
- Tony 300 meters
540
SOCIAL MEDIA
- "Who wants to go for coffee?
- "Watching World Cup Soccer – Italy is winning! Yea!"

FIG. 8

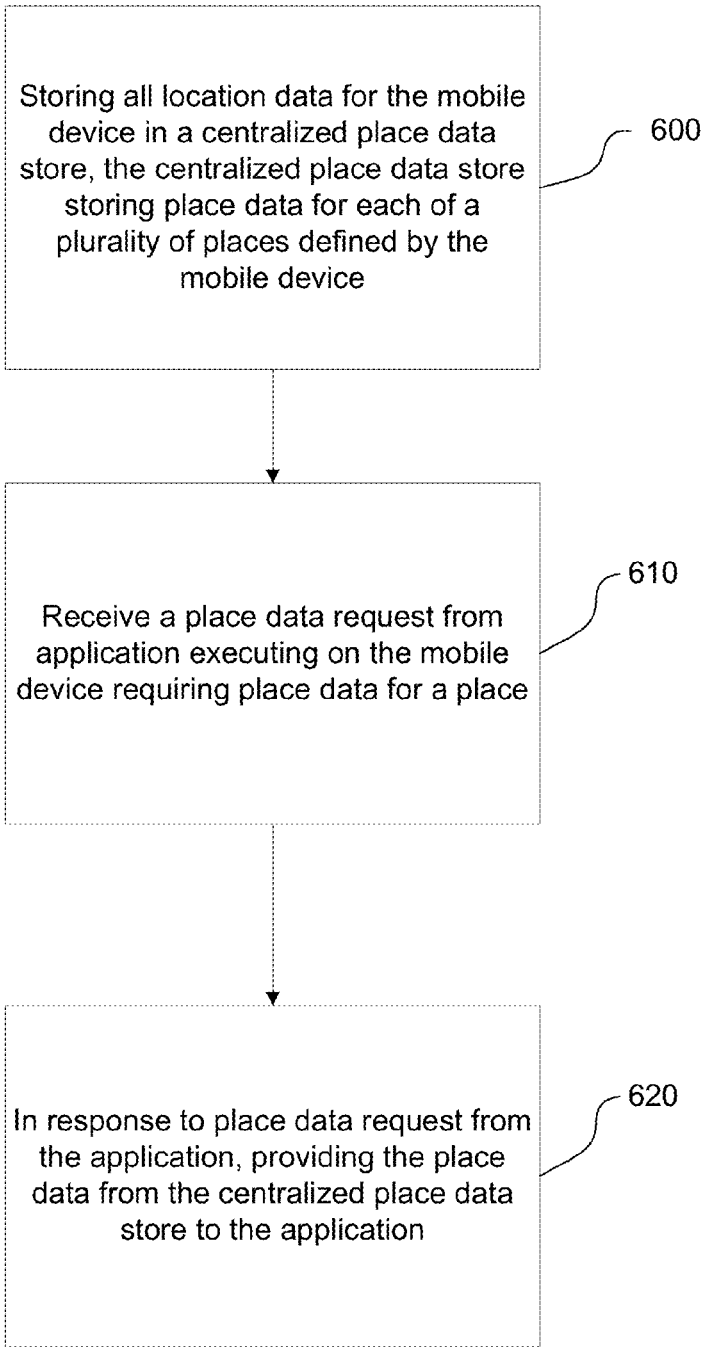
Storing all location data for the mobile device in a centralized place data store, the centralized place data store storing place data for each of a plurality of places defined by the mobile device
600
Receive a place data request from application executing on the mobile device requiring place data for a place
610
In response to place data request from the application, providing the place data from the centralized place data store to the application
620

FIG. 9

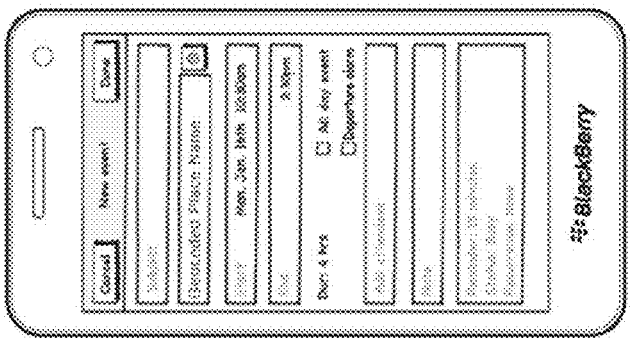

FIG. 10d

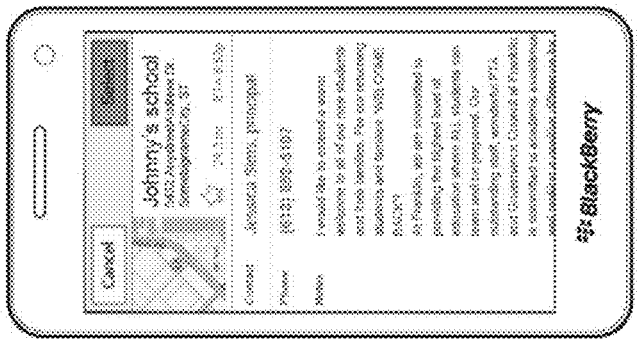

FIG. 10c

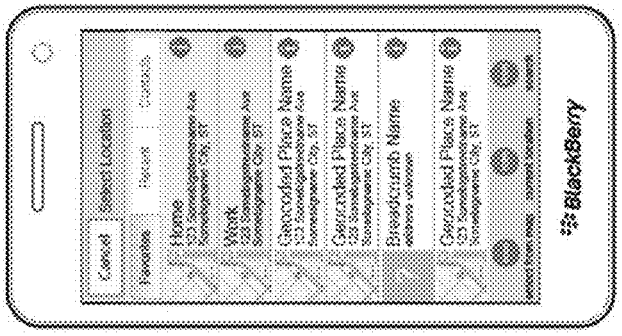

FIG. 10b

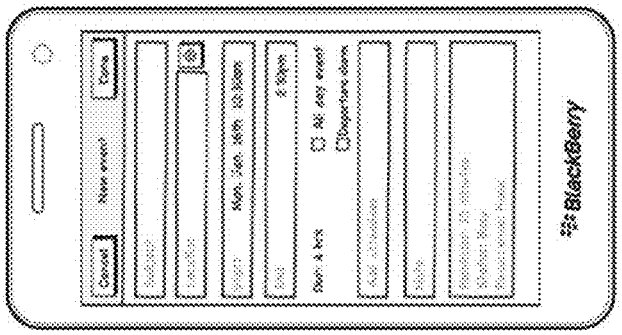

FIG. 10a

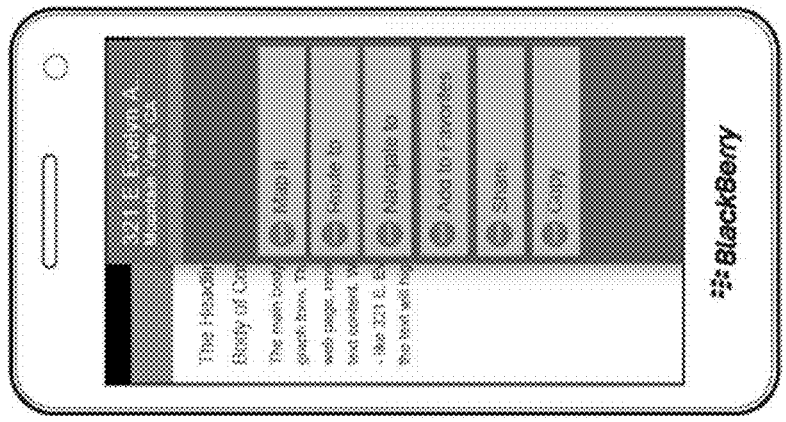

FIG. 11c

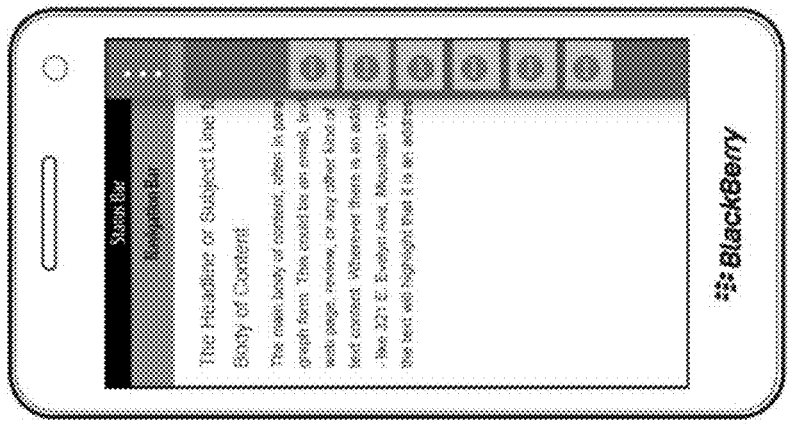

FIG. 11b

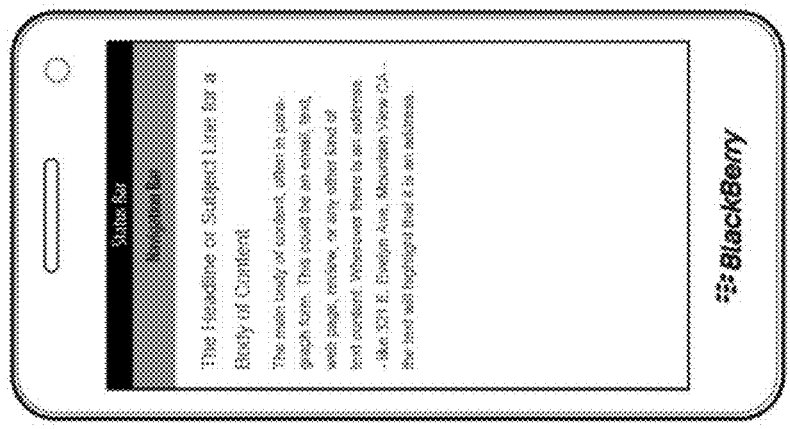

FIG. 11a

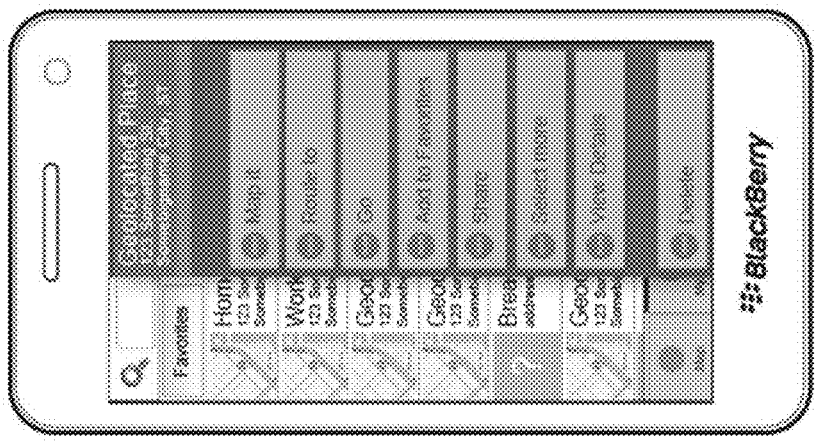

FIG. 12c

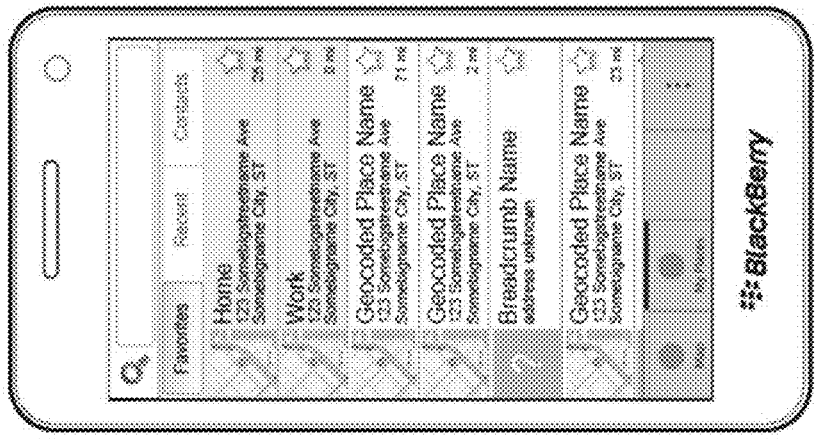

FIG. 12b

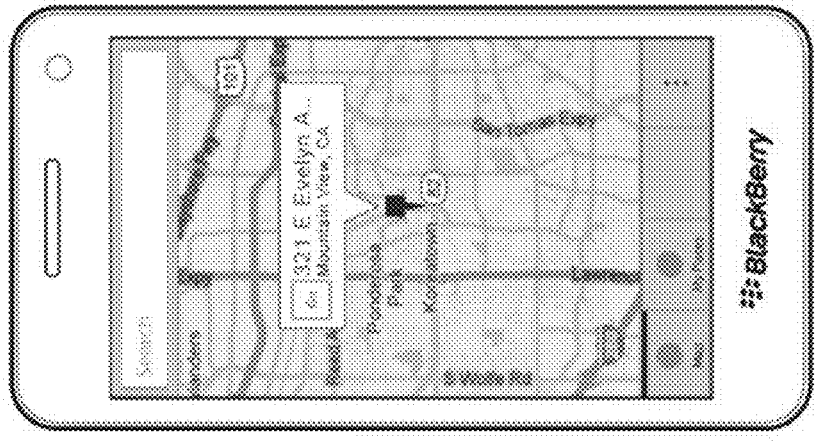

FIG. 12a

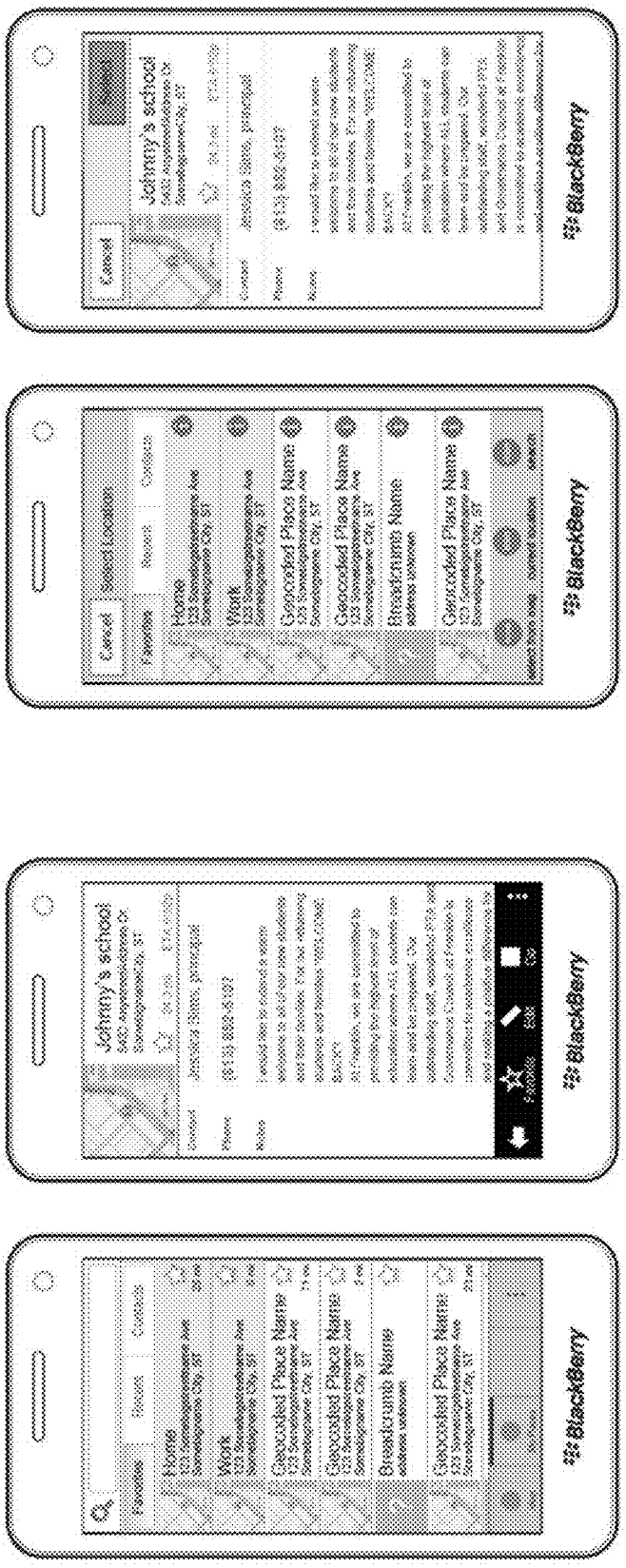

FIG. 13a FIG. 13b FIG. 13c FIG. 13d

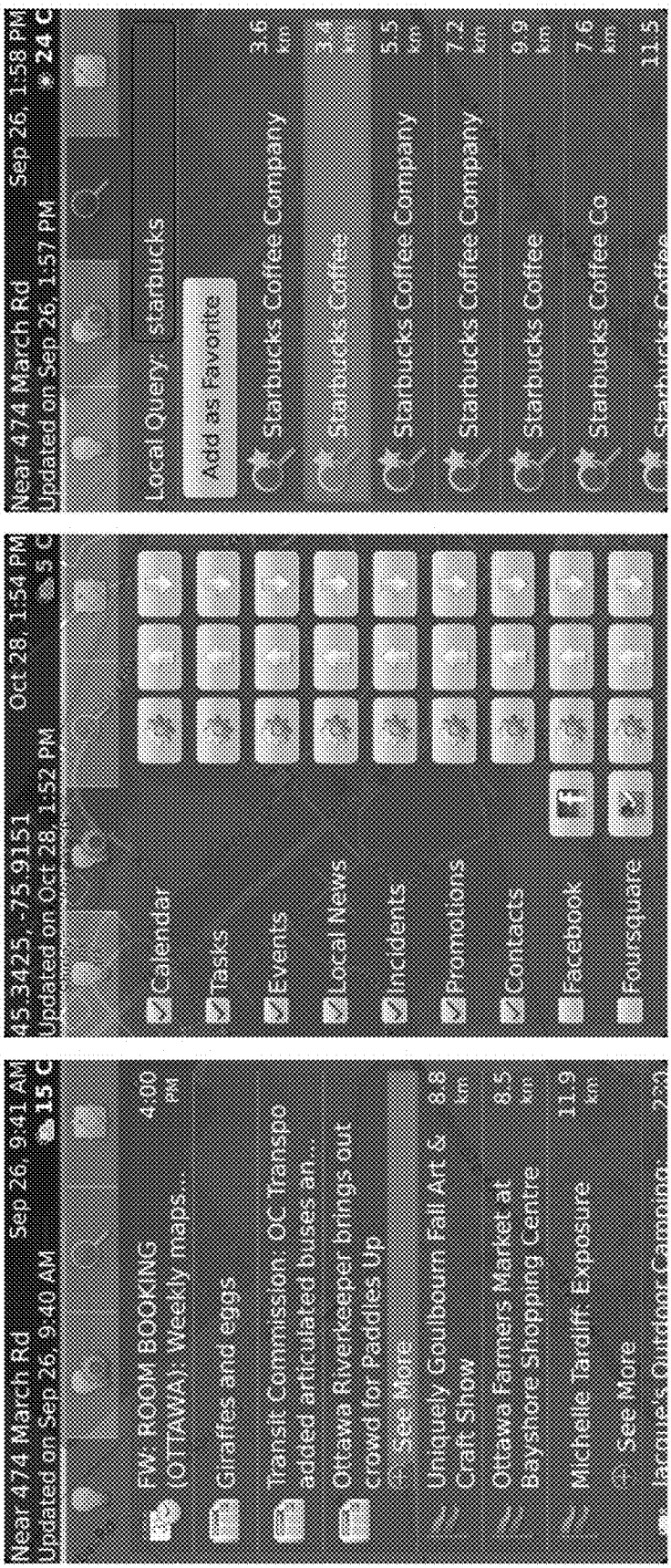

FIG. 14a

FIG. 14b

FIG. 14c

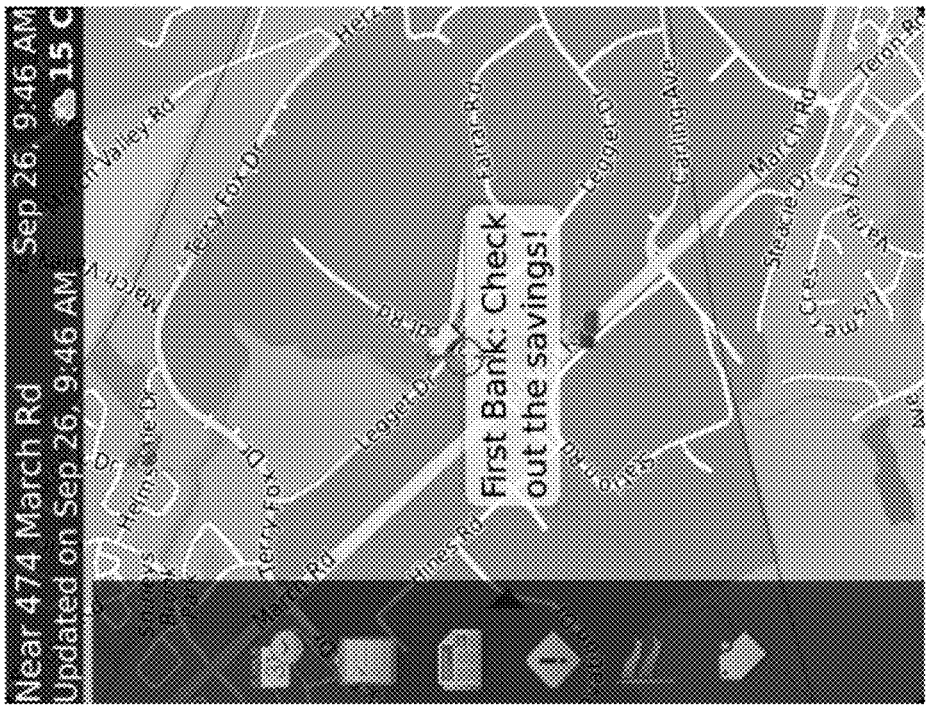

FIG. 15b

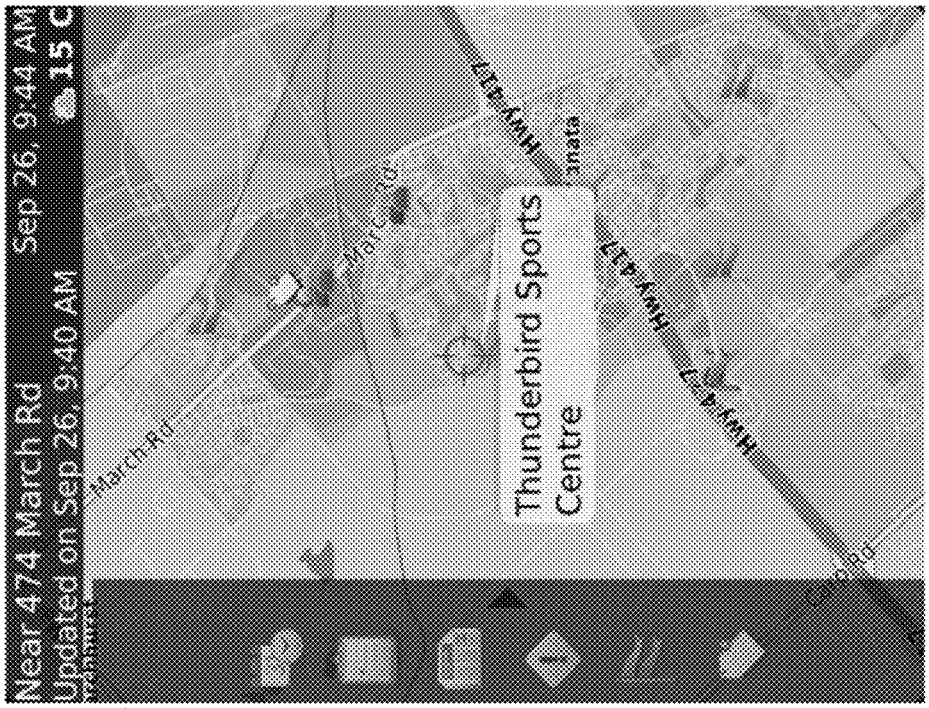

FIG. 15a

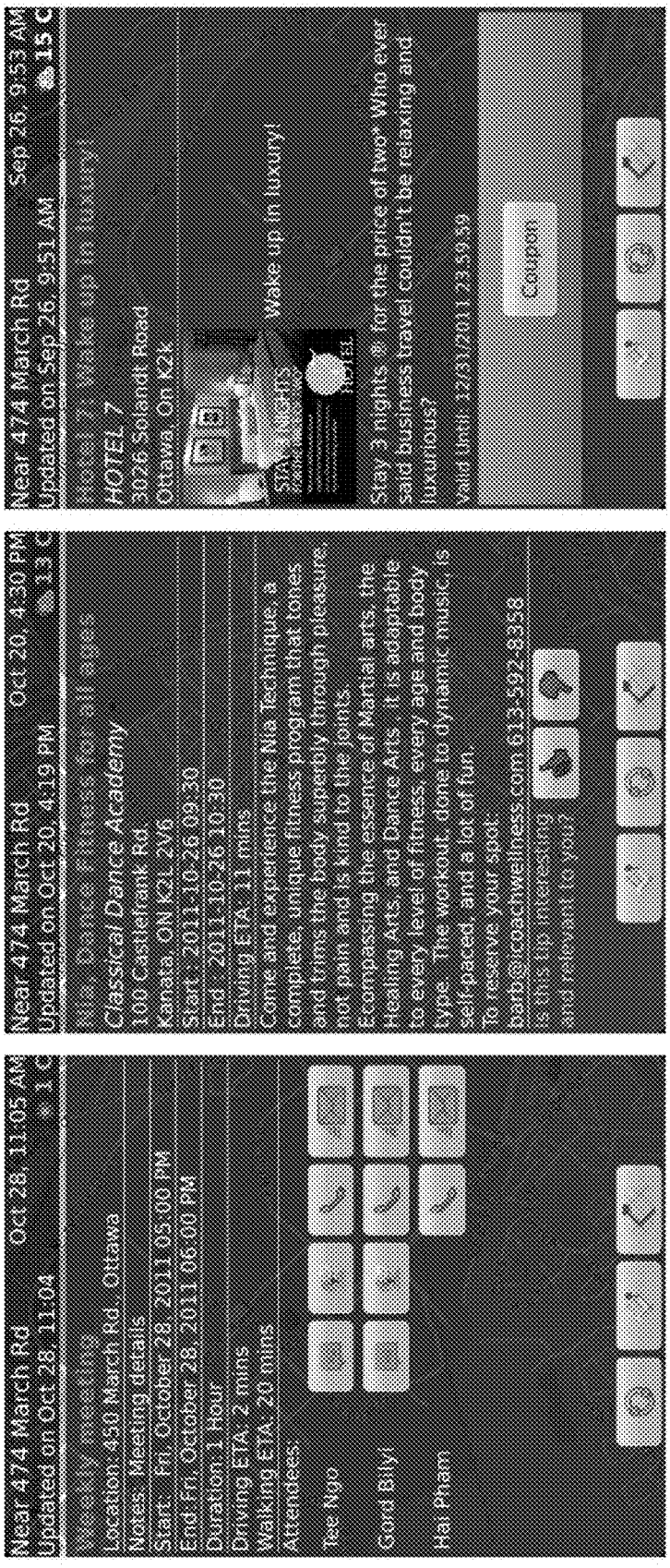

FIG. 16a

FIG. 16b

FIG. 16c

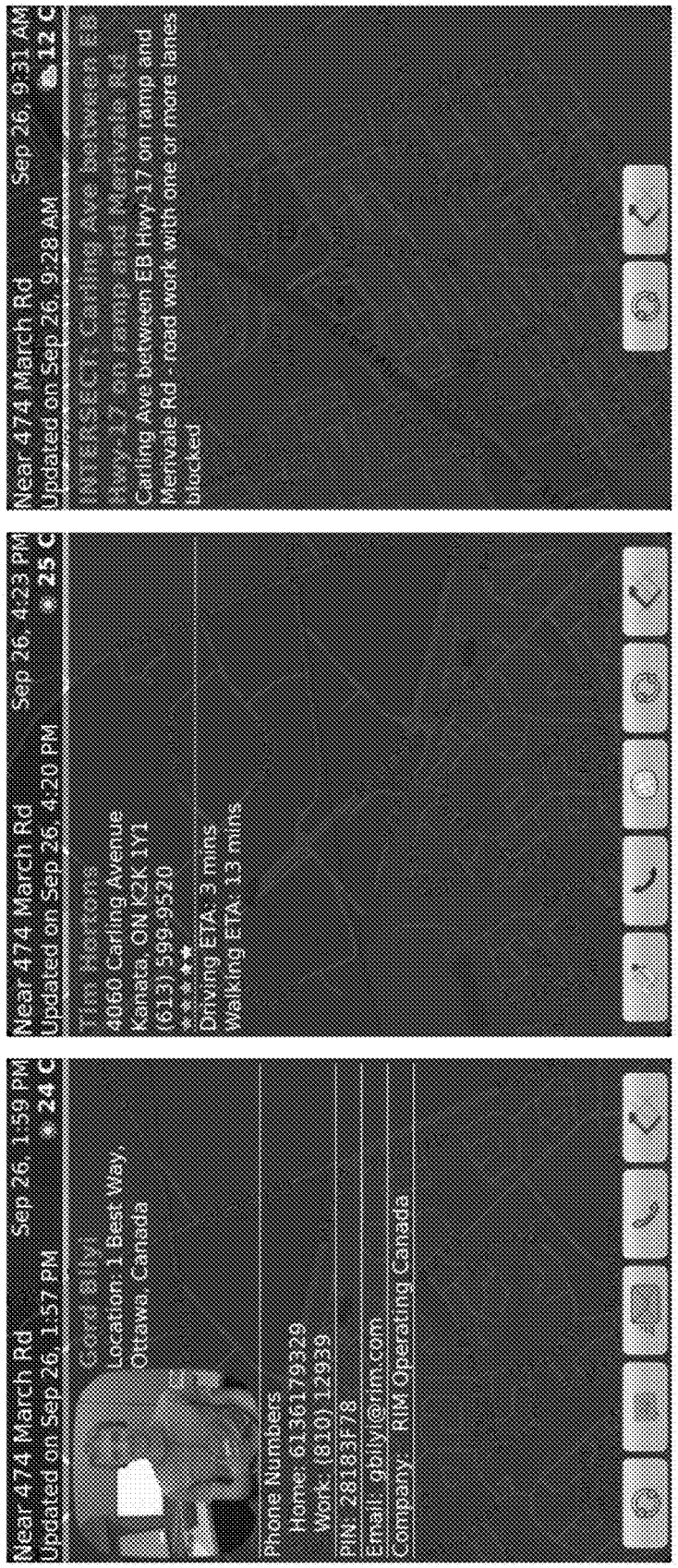

FIG. 17a

FIG. 17b

FIG. 17c

CENTRALIZED DATA STORE FOR PROVIDING ALL PLACE-RELATED DATA TO APPLICATIONS ON A MOBILE DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of application Ser. No. 13/566,124 filed Aug. 3, 2012, the entire disclosure of which is hereby incorporated by reference for all purposes.

TECHNICAL FIELD

The present technology relates generally to mobile devices and, in particular, to location-based services for mobile devices.

BACKGROUND

Mobile devices or wireless communications device may offer location-based services (LBS). In a traditional paradigm, each application on the device that utilizes location data (e.g. maps, calendar, address book, instant messaging, etc.) stores its own location data. This redundant data is not only duplicated on the device but techniques for sharing of this data across applications are presently quite limited. Improvements on the foregoing are thus highly desirable.

BRIEF DESCRIPTION OF THE DRAWINGS

Further features and advantages of the present technology will become apparent from the following detailed description, taken in combination with the appended drawings, in which:

FIG. **1** is a depiction of a mobile device on which the present technology may be implemented, the depiction including a schematic depiction of some components of the mobile device;

FIG. **2** is a functional block diagram of a place-data management system in accordance with one implementation of the present technology;

FIG. **3** is a schematic depiction of the centralized place data store for providing all location data to all applications executed by the mobile device;

FIG. **4** is a schematic depiction of the various categories or types of place data that the centralized place data store maintains for each place;

FIG. **5** is an example of a map displayed by a mapping application on a mobile device, showing a user interface element for setting a POI as a favourite place;

FIG. **6** is an example of a UI that presents favourite places;

FIG. **7** is an example of a UI that presents place data for one selected place;

FIG. **8** is another example of a UI that presents place data for one selected place;

FIG. **9** is a flowchart depicting steps of a method in accordance with one implementation of the present technology;

FIGS. **10***a*-**10***d* depict mobile device user interfaces for creating new data for a place;

FIGS. **11***a*-**11***c* depict mobile device user interfaces for displaying a menu of action options for performing various actions in relation to a place;

FIGS. **12***a*-**12***b* depict mobile device user interfaces that enable toggling between a map and a list of favourite places ("My Places");

FIG. **12***c* depicts a menu of action options for performing various actions in relation to a geolocated place;

FIGS. **13***a*-**13***d* depict various place-related user interfaces; and

FIG. **14***a* depicts a place view UI that lists all content related to the place;

FIG. **14***b* depicts a UI that enables the user to control which types of content is to be presented;

FIG. **14***c* depicts a local query UI with a UI element for adding one of the search results as a favourite place;

FIG. **15***a* depicts a map showing a POI that is near a place;

FIG. **15***b* depicts a map showing a POI augmented with location-based advertising;

FIG. **16***a* depicts a place view for a weekly meeting;

FIG. **16***b* depicts one example of a place view for a commercial establishment;

FIG. **16***c* depicts another example of a place view for a commercial establishment;

FIG. **17***a* depicts a place view for a contact;

FIG. **17***b* depicts a place view for a coffee shop; and

FIG. **17***c* depicts a place view for an intersection, showing a traffic update.

It will be noted that throughout the appended drawings, like features are identified by like reference numerals.

DETAILED DESCRIPTION

The present technology provides a novel system and method that implements a novel place data paradigm for managing, using and presenting place data. Dispensing with the conventional data silos for place or location data on a device, the present technology creates a centralized place database on or accessible by the device so that all applications that utilize place data may obtain the place data from this centralized place database. This technique may ensure that the place data is used, presented and managed in a consistent manner. It may also permit place data to be shared with an efficiency and ease that was not previously possible. The centralized place database may furthermore collect, aggregate, and collate place-related information and content for each place specified by the user or identified by the device. This collation of place data may centralize and consolidate all of the place-related information and content for a given place. This place-centric paradigm may enable the device to present to the user all of the relevant content for a specific place. The device may thus present, in one view, content that would otherwise be viewable only through each separate applications: meetings, tasks, events, news, weather, etc. that occur at or near the place, or which have some relevancy or connection to the place.

Accordingly, one aspect of the present technology is a method of managing place data for a mobile device, the method comprising storing all place data for the mobile device in a centralized place data store, the centralized place data store storing place data for each of a plurality of places, and in response to place data requests from a plurality of applications executing on the mobile device, providing the place data from the centralized place data store to the plurality of applications.

Another aspect of the present technology is a computer-readable medium comprising instructions in code which when loaded into a memory and executed by a processor of a mobile device cause the mobile device to store all place data for the mobile device in a centralized place data store, the centralized place data store storing place data for each of a plurality of places and, in response to place data requests from a plurality of applications executing on the mobile device, provide the place data from the centralized place data store to the plurality of applications.

Another aspect of the present technology is a mobile device having a position-determining subsystem for determining a position of the mobile device, a memory for storing all place data for the mobile device in a centralized place data store for each of a plurality of places, and a processor operatively coupled to the memory for executing a plurality of applications, to determine when place data is required for the applications, and to obtain all of the place data required for all applications on the mobile device from the centralized place data store.

The details and particulars of these aspects of the technology will now be described below, by way of example, with reference to the drawings.

FIG. **1** is a depiction of a wireless communications device as one example of a mobile device that may be used to implement this novel technology. Examples of a mobile device or wireless communications device include cell phones, smart phones, mobile phones, portable digital assistants, or any other such portable or handheld electronic communications devices.

As shown by way of example in FIG. **1**, the mobile device, which is generally designated by reference numeral **100**, includes a processor **110** and memory **120**, **130** for executing one or more applications. The memory may include flash memory **120** and/or random access memory (RAM) **130**. Other types or forms of memory may be used.

As depicted by way of example in FIG. **1**, the mobile device **100** includes a user interface **140** for interacting with the mobile device and its applications and, in this instance, for receiving user input to set up a call to another device. The user interface **140** may include one or more input/output devices, such as a display screen **150** (e.g. an LCD or LED screen or touch-sensitive display screen), and a keyboard or keypad **155**. The user interface may also include an optical jog pad **160** and/or a thumbwheel, trackball, track pad or equivalent.

As depicted by way of example in FIG. **1**, the mobile device **100** may include a wireless transceiver **170** for communicating with other devices. The transceiver **170** may be a radiofrequency (RF) transceiver for wirelessly communicating with one or more base stations **50** over a cellular wireless network using cellular communication protocols and standards for both voice calls and packet data transfer such as GSM, CDMA, GPRS, EDGE, UMTS, LTE, etc. Where the computing device **100** is a wireless communications device, the device may include a Subscriber Identity Module (SIM) card **112** for GSM-type devices or a Re-Usable Identification Module (RUIM) card for CDMA-type devices. The RF transceiver **170** may include separate voice and data channels.

The mobile device **100** may optionally include one or more ports or sockets for wired connections, e.g. USB, HDMI, FireWire (IEEE 1394), etc. or for receiving non-volatile memory cards, e.g. SD (Secure Digital) card, miniSD card or microSD card.

For voice calls, the mobile device **100** includes a microphone **180**, a speaker **182** and/or an earphone jack. Optionally, the device may include a speech-recognition subsystem for transforming voice input in the form of sound waves into an electrical signal. The electrical signal is then processed by a speech-recognition module (digital signal processor) to determine voice commands from the voice input. Voice commands may be used to initiate a call and to select the call recipient from an address book.

Optionally, the mobile device **100** includes a positioning subsystem such as a Global Positioning System (GPS) receiver **190** (e.g. in the form of a chip or chipset) for receiving GPS radio signals transmitted from one or more orbiting GPS satellites. References herein to "GPS" are meant to include Assisted GPS and Aided GPS. Although the present disclosure refers expressly to the "Global Positioning System", it should be understood that this term and its abbreviation "GPS" are being used expansively to include any satellite-based navigation-signal broadcast system, and would therefore include other systems used around the world including the Beidou (COMPASS) system being developed by China, the multi-national Galileo system being developed by the European Union, in collaboration with China, Israel, India, Morocco, Saudi Arabia and South Korea, Russia's GLONASS system, India's proposed Regional Navigational Satellite System (IRNSS), and Japan's proposed QZSS regional system.

Another sort of positioning subsystem may be used as well, e.g. a radiolocation subsystem that determines its current location using radiolocation techniques, as will be elaborated below. In other words, the location of the device can be determined using triangulation of signals from in-range base towers, such as used for Wireless E911. Wireless Enhanced 911 services enable a cell phone or other wireless device to be located geographically using radiolocation techniques such as (i) angle of arrival (AOA) which entails locating the caller at the point where signals from two towers intersect; (ii) time difference of arrival (TDOA), which uses multilateration like GPS, except that the networks determine the time difference and therefore the distance from each tower; and (iii) location signature, which uses "fingerprinting" to store and recall patterns (such as multipath) which mobile phone signals exhibit at different locations in each cell. A Wi-Fi™ Positioning System (WPS) may also be used as a positioning subsystem. Radiolocation techniques and/or WPS may also be used in conjunction with GPS in a hybrid positioning system.

Optionally, the mobile device **100** may include a Wi-Fi™ transceiver **192**, a Bluetooth® transceiver **194**, and/or a near-field communications (NFC) chip. The mobile device **100** may also optionally include a transceiver for WiMax™ (IEEE 802.16), a transceiver for ZigBee® (IEEE 802.15.4-2003 or other wireless personal area networks), an infrared transceiver or an ultra-wideband transceiver.

Optionally, the mobile device may include other sensors like a digital compass **196** and/or a tilt sensor or accelerometer **198**.

The mobile device **100** thus uses its memory **120**, **130** to store all place data for the mobile device in a centralized place data store for each of a plurality of places. The centralized place data store may be a single data store or may be a group of co-operative data stores, or any suitable arrangement of data stores. The centralized database or data store may be a unified, common, or shared database or data store. The processor **110** is operatively coupled to the memory **120**, **130** to execute a plurality of applications. These applications may require positioning data, e.g. GPS coordinates. The processor determines when place data or more broadly place-related data is required for the applications and obtain all of the place data (or place-related data) required for all applications on the mobile device from the centralized place data store (consolidated place database) **200**. In another implementation, the centralized place data store (or consolidated place database) may be situated at a server that is accessible by the mobile device.

For the purposes of this specification, place data (or place-related data) is data, e.g. computer-readable code that represents place-related information or place-related content that describes a place. The place-related content and information may be text, maps, photos, video, audio files, or other data. The place-related information and content is thus a multi-faceted description of the place. One element of this descrip-

tion is the location of the place, which may be characterized by location data, such as for example location coordinates, a street address, etc. Thus, the place data encompasses the location data. For the purposes of this specification, place data is meant to encompass not only the data itself but also any references or links to place data stored externally to the centralized place data store. In some embodiments, there may be restrictions inhibiting the physical storage of all place data in the centralized place data store with the rest of the place data. Examples of externally stored data may be any restricted, confidential, or proprietary data that may not be copied to the centralized data store. In these embodiments, only the references or links to the externally stored data are actually stored in the centralized place data store, not the data itself. Nonetheless, the centralized place data store remains the sole recipient of all place data requests from applications. In other words, all applications on the mobile device access only the one centralized place data repository for all required place data.

In one embodiment, the centralized place data store **200** comprises, for each place, a place tag identifying the place. The place is either a physical location or, in some embodiments, a virtual location. A physical location means a geographical location somewhere on earth. A virtual location may be a virtual location or an event that is a proxy for a location such as a meeting (Web conference), conference call, or some other proxy for location that has a location-implicit meaning to the user. In other words, although a virtual meeting may be physically performed at any computer, to the user this virtual meeting implies a place (e.g. his home computer or alternatively his work computer, depending on his own personal context, or the implied place may be within a perimeter or partition on the same device, for example a device having a work or personal perimeter). The physical location is defined by location coordinates, e.g. latitude and longitude coordinates which may be GPS-derived. A user-specified virtual location descriptor identifies the virtual location to the user and this virtual location may not have any physical coordinates associated with it.

Conceptually, the centralized place data store **200** may be understood as being the core of a places framework such as the one depicted schematically in FIG. **2**. The place-related data is not only centralized but this data includes semantic place data that provides a much richer level of place-related content that is conventionally provided. As shown by way of example in FIG. **2**, a plurality of device applications (be it applications that are native to the device or third-party applications) interact with the place framework. Some apps may be place data contributors, some may be place data consumers, and some may be both consumers and contributors. This framework includes various modules, as shown, for rules/filtering, caching/syncing, statistics/context analysis, actions, privacy control, notification, location selection, geofencing, collation/aggregation. The actions module interacts with a common action UI that provides functionalities such as mapping, navigation, sharing, calling, browsing, chatting, etc. Therefore, for any location, any of these functions can be performed. In one embodiment, depending on the types of place content available for the place, the relevant actions will be associated with the data and thus can be visually presented to the user and acted upon. The place content type may thus limit the available functionalities/actions for a given place. For example, a share action may be possible for a virtual place whereas a map/navigate action would only be applicable to a physical place (i.e. a real-world location). Backend services, as shown in FIG. **2**, may provide collation/aggregation of various content types such as events, deals, POIs, news, traffic incidents, etc. As further depicted by way of example in FIG. **2**, the system may include a context API that interacts with a context server having a recommendation engine. This context server may be used to monitor usage patterns (user behaviour) at a given place to see what the user does at that place. Based on the activities and the data requests of the user at that place, the system can intelligently learn the user's personal preferences as they relate to that specific place. This contextual information may be used to supplement the place data in the centralized place data store **200**.

As further illustrated by way of example in FIG. **3**, the centralized place data store **200** stores all of the place-related data for a plurality of places. The places may be user-defined or externally defined places. As shown in FIG. **3**, the store **200** stores a collection or list of places. Associated with each place is a set of place-related auxiliary data (or synonymously "place data" or "place-related data"). Place auxiliary data is either application-specific data or non-application specific data that describes the place. An example of application-specific auxiliary data are meeting attendees (Calendar app) associated at this given place. Examples of non-application specific auxiliary data are videos, documentary/blogs, statistical data, etc., associated with the place. The place-related auxiliary data can be physically stored in the central Places database or referenced in the Places database to their respective sources.

Each application (calendar, tasks, events, contacts, weather alerts, incidents, promotions, Foursquare, Facebook, local news, etc.) obtains all of its place-related data from the centralized place data store **200**. This consolidated data store simplifies data updates, ensures consistency of data, and minimizes memory usage.

FIG. **4** depicts schematically the various types or categories of place data that may be stored in the centralized place data store **200**. For example, each place may be characterized by a tag (name) describing the place, location coordinates (latitude and longitude), its category, a description of the place, keywords related to the place, a start/end time (or an expiry time for the data), auxiliary data such as contacts related to the place, images or photos of the place, videos of the place, URLs to websites related to the place. In addition, as shown in FIG. **4**, there may be categories such as available actions, rules governing how the place data is to be shared or not amongst the applications running on the device, or how this data is accessed, persisted or visually presented, relationships to contacts or other persons, events, or other places that are in some way related to the place, etc. Relationships may also include relationships between the place and another place or between the place and a plurality of other places. Relationships may also encompass relationships between a place and an event. The relationship between a place and people or events is described in the auxiliary data. As will be appreciated, the categories or types of data may vary. Not all of the types or categories of data for a given place will be specified. In some embodiments, only a subset of these categories is utilized.

For example, in one embodiment, the centralized place data store comprises, for each place, a data owner identifier that identifies an application that owns the data. In one embodiment, the centralized place data store comprises, for each place, a set of rules specifying how the data is to be shared, accessed, persisted or visually presented. In one embodiment, the centralized place data store comprises, for each place, a set of relationships identifying contacts related to the place. In one embodiment, the centralized place data store comprises, for each place, an expiry date specifying when the data will expire or need to be refreshed. In one

embodiment, the centralized place data store comprises a set of actions to be performed which are relevant or applicable to the place. Any combination of these data characteristics or attributes may be utilized to characterize a place, i.e. to give the place its semantics.

As mentioned above, place data may also be inferred or learned by the mobile device in response to user behaviour or activities performed by the user using the mobile device when situated at a place or when requesting data about a place. Therefore, in one embodiment, the processor and memory cooperate to monitor usage of location data (or more broadly place data) by a user of a mobile device when located at a place, derive contextual information about the place and the personal preferences of the user with respect to the place, and integrate the contextual information as additional place-related data.

In another aspect of the technology, the mobile device may regulate how place data is delivered to the various applications on the mobile device. Therefore, in one embodiment, the processor and memory cooperate to register an application for proximity notification. The processor then determines if the mobile device is within a predetermined proximity of a place. In response to determining that the mobile device is within the predetermined proximity of the place, the processor provides a proximity notification to the application.

FIG. **5** is an example of a map displayed by a mapping application **300** on a mobile device, showing a user interface element for setting a POI **310** as a favourite place.

FIG. **6** is an example of a UI that displays favourite places ("My Favourite Places") on a display screen **150** of a mobile device **100**. The favourite places UI **400** presents the favourite places as a favourite places list **410**, although the favourite places may be displayed in any suitable format. In one embodiment, each listed place **420** is user-selectable (by touching or any other appropriate form of user input) to obtain more information about the listed place. For example, touching or selecting bus stop will cause the device **100** to display a place view for the bus stop. The place view may present place-related information (i.e. auxiliary data related to the place) as shown in FIG. **7** or, alternatively, FIG. **8**. In the example of FIG. **7**, the place view **500** displayed on the display **150** of the mobile device **100** comprises a plurality of user-selectable categories of place-related data, e.g. promotions & e-coupons **510**, local news & weather **520**, nearby friends **530** and social media **540**. These are solely by way of example, and other categories, layouts or labels may be used. The user may select any one of the categories **510-540** by touching the user interface elements. Alternatively, as shown in FIG. **8**, the UI may display all or a subset of the available and most recent place data based on time received, relevancy, or any other prioritization scheme. The UI in FIG. **8** shows the promotions and e-coupons that are relevant for the place (i.e. for the Bus Stop), the local news and weather for the bus stop, which friends are near the bus stop, and any social media feeds that may have some relevancy to the area surrounding the bus stop. The place view thus consolidates and presents all place-related content to the user when the user selects the place. Note that selecting a place may be done without the user physically traveling to the place although in one embodiment the place may be set to correspond to the current location of the mobile device. For each UI shown in FIGS. **6-8**, there may be applicable actions displayed as will be illustrated, for example, in FIG. **11***c*). The actions may include, for example, map, go, browse, call, etc. for the selected place.

The foregoing technology also provides a novel method of managing place data for a mobile device. As outlined by the flowchart depicted in FIG. **9**, the method comprises a step **600** of storing place data for the mobile device in a centralized place data store. In some embodiments, all place data is stored in the data store whereas in other embodiments, not all of the place data is stored in the data store. The centralized place data store stores place data for each of a plurality of places. At step **610**, a place data request is received from an application executing on the mobile device. The application requires place data for a place. At step **620**, in response to the place data request from the application executing on the mobile device, the device provides the place data from the centralized place data store to the requesting application. Centralizing all place data in a central place repository enables place data to be viewed, updated or added by one application to be accessible to all other applications that have the permission to view that place data. The centralized database makes data sharable among apps on the device, improves security/privacy by implementing configurable data-sharing rules, ensures consistency in how data is presented and used, optimizes memory usage as data is no longer duplicated for each app, and is extensible via pluggable data sources as new place content sources can be connected. In some embodiments, the place data requests do not need to be received concurrently or simultaneously, and furthermore the applications executing on the device also do not need to be executing concurrently or simultaneously.

FIGS. **10***a*-**17***c* present various user interfaces that may be used on a mobile device in relation to the foregoing technology. These are presented solely to further illustrate the inventive concepts and should not be interpreted as limiting the invention or as representing the only UIs that may implement this novel place-data-centric paradigm. Other UIs with other layouts, configurations, and labels may be employed to implement this novel technology.

FIGS. **10***a*-**10***d* depict mobile device user interfaces for creating new data for a place. FIG. **10***a* shows a UI for creating a new event. Exemplary fields include subject, location, start time, end time, attendees, notes, reminder, status, recurrence, etc. Similarly, FIG. **10***d* shows the UI in which the location field of the meeting event is now populated with the place selected by the user via the UIs depicted in FIGS. **10***b* and **10***c*.

FIG. **10***b* shows a UI that displays a list of places or locations. The device may provide a favourites list, a recent list, and a contacts list, as shown. User interface elements may be provided to select a location from a map, to use the current location of the device or to search. FIG. **10***c* depicts a UI that displays a place ("Johnny's school"), its address, distance, driving time (ETA), contact information (the principal's name), phone number, and notes relating to the place (i.e. relating to the school).

FIGS. **11***a*-**11***c* depict mobile device user interfaces for displaying a menu of action options for performing various actions in relation to a recognized place in the text field. Specifically, FIG. **11***a* shows a UI displaying a corpus of textual content from which an address is identified. Identification of the address may be done by parsing the text. The address may be hyperlinked or otherwise highlighted. A menu may slide out from the right side of the UI, as shown in FIG. **11***b* to provide menu items (actions) that may be performed in relation to the location (address). For example, the menu items may include actions such as map it, route to, navigate to, add to favourites, share, copy, etc. The add to favourites action adds the place the Places repository.

FIGS. **12***a*-**12***b* depict mobile device user interfaces that enable toggling between a map and a list of favourite places ("My Places"). Specifically, in FIG. **12***a*, a map is displayed on a mobile device to show, in this example, a pushpin icon

representing a specific address. The address is displayed in this example in a text bubble or callout that points to, or is otherwise associated with, the pushpin icon. The UI may comprise a map button and a My Places button (e.g. at the bottom of the screen, below the map, as shown by way of example in FIG. **12***a*). These buttons may be touched or selected to toggle between a map view and a places view such as the one shown by way of example in FIG. **12***b*. The user may then touch or select any one of these places. In response to touching a place, an action menu is then displayed as shown in FIG. **12***c*. This menu of action options enables the user to perform various actions in relation to a place such as map it, route to, go, add to favourites, share, select more, view details, delete, etc.

FIGS. **13***a*-**13***d* depict various place-related user interfaces as further examples. These figures illustrate the concept of providing place details for a selected place. For example, from the UI of FIG. **13***a*, the user may select one of the listed places to obtain place details such as shown in FIG. **13***b*. Likewise, the user may select a place displayed on the UI of FIG. **13***c* to obtain place details as shown in FIG. **13***d*.

Another set of examples (FIGS. **14**-**17***c*) illustrate how place-related location data may be exploited to provide new device functionalities and features that were hitherto not possible with pre-existing technologies. In these figures, a place is defined in terms of a predetermined proximity to a location, in this example a user-specified address (e.g. "Near 474 March Rd"). The device may be configurable to specify a distance threshold, spatial tolerance or radius that defines "near", e.g. within 50 meters, 100 meters, 250 meters, 1 km, 10 km, etc. In other embodiments, the device may provide a tiered approach, defining "at" to be within 10 meters, "near" to be within 100 meters, and "in the same general vicinity" to be within 1 km, for example. These examples illustrate how a given application executing on the mobile device or even multiple applications acting in concert or executing in parallel, may retrieve or obtain from the centralized place data store whatever place-related data is available for the place selected by the user or otherwise identified as the desired place by the mobile device. In each instance, the device may use this place-related data to provide location-based services (LBS) or may display the place-related data to the user in any number of ways, some of which are presented below.

FIG. **14***a* depicts a place view UI that lists all content related to the place. This UI is an example of how a place view may present place-related information to the user of various types (i.e. for various applications). For example, as shown in FIG. **14***a*, the place view presents a calendar entry, local news, local events/POIs. This UI thus provides a consolidated (overview) display of all place-related content where the displayed items of content are associated with a plurality of different applications. FIG. **14***b* depicts a UI that enables the user to control which types of content is to be presented on this consolidated (overview) display. Other functionalities may be provided on these UIs. For example, near the top of each screen are user interface elements that provide functionalities such as view list, configure which applications to show, search and view map. For example, touching the search button will cause the UI to switch to a search screen such as the one depicted in FIG. **14***c*. As shown in FIG. **14***c*, the local query may be entered. Search results are displayed along with distance information. A UI element is provided for adding one of the search results as a favourite place.

FIGS. **15***a* and **15***b* show how points of interest (POIs) may be displayed near the place selected by the user or otherwise identified by the mobile device. The POI may be filtered by user preferences, which may have been set explicitly by the user or which may have been learned by monitoring usage patterns of the mobile device at this or other places. FIG. **15***a* depicts a map showing a POI that is "near 474 March Rd". In FIG. **15***a*, the POI ("Thunderbird Sports Centre") may be of interest to the user because of some prior relationship with that POI (visited there, placed a phone call there, e-mailed there, visited their website, searched for sports centres, etc.)

FIG. **15***b* depicts a map showing a POI augmented with location-based advertising "First Bank: Check out the savings!". The location-based advertising (LBA) may be filtered based on user settings and/or based on usage patterns. For example, the mobile device may recognize that the user has recently searched for banks, or has visited this bank in recent months, done online banking with that bank, or has a friend or contact that works there, etc.

FIGS. **16***a*-**16***c* depict further UI examples of how place-related content may be delivered and presented to the user of the mobile device.

FIG. **16***a* depicts a place view for a weekly meeting as one example of a calendar event. This calendar event may be stored in the calendar application data store but the location data and any other place-related information about the place where the meeting occurs every week is stored in the centralized place data store. This UI may be accessed by opening or viewing the weekly meeting entry in the calendar application which then queries the centralized place data store to obtain the place data for this place and any place-related information that may be relevant to the user for that place. Alternatively, the user may access this calendar entry via the places view by navigating to the place in question (e.g. using My Places) and then clicking on the calendar event that is listed for that place. In FIG. **16***a*, the UI presents an indication of the address of the place (e.g. "near 474 March Rd"), the current date and time, current weather conditions, and an indication of when the place data was most recently updated. The UI also specifies the event location, start and end times, the driving and walking times (ETA) from the current location to the meeting or event location. Also noteworthy are the list of attendees who are scheduled to attend the meeting, as well as a plurality of user-selectable icons or interface elements that enable the user to communicate or otherwise interact with any one of the attendees. The attendees are examples of relationships (mentioned above) for the place. Other examples of relationships may be a pool of tennis players with whom a user habitually plays at a tennis club. When the user accesses the place view for the tennis club, these contacts may be displayed.

FIG. **16***b* depicts another example of a tip or suggested event that is suggested by the device to the user based on contextual information gleaned by the device about the user's habit and behaviour at that place. In this case, the device learns that the user enjoys attending dance classes at a nearby dance academy. The device then suggests to the user that she consider attending an upcoming dance class at the dance academy. This suggestion or tip enhances the user experience by informing the user of events, activities, offers, promotions, opportunities, etc. that are local or proximate to one of the user's places.

In addition to the address, start and end times, and driving time, the tip UI may present a description of the event or appointment, contact information (e-mail and phone) for reserving a spot at the dance class. The UI may present tip feedback icons (thumbs-up and thumbs-down icon, or yes/no, or a rating scale). Soliciting and obtaining this direct feedback from the user is another way of learning usage patterns, interests and preferences of the user. Future tips can be refined based on whether the user found the tip, suggestion or offer interesting. These tips may be generated by the mobile device

or they may originate as LBA, which the device can filter or even modify (e.g. reformatting content) for the device.

FIG. **16***c* depicts an example of LBA that is offered to the user of the mobile device. In this example, the UI displays the ad or promotional offer onscreen. The offer, in this particular example, contains an e-coupon. A user interface element ("Coupon") may be displayed onscreen to permit the user to download the e-coupon.

FIGS. **17***a*-**17***c* depict various further example place views where the place is again defined in terms of a predetermined proximity to the same specified address (e.g. "Near 474 March Rd"). Once the place and its distance threshold has been set, as described above, the application (contacts) may request any contacts that are at this place (i.e. at or near 474 March Rd). By applying this filter, the contact Gord Bilyi is provided from the centralized place data store to the contacts application which can then display the contact for the user. Various user interface elements may be provided to interact with the contact, e.g. send mail, call, navigate to the contact's location, etc. As further depicted by way of example, the UI may also display an update time indicating when the data was last updated (e.g. "Updated on Sep 26, 1:57 PM").

In FIG. **17***b*, the place has been used to obtain information about a local coffee shop ("Tim Hortons") that is near 474 March Rd, e.g. via a local search or local query filtered using the location of the place. The address, phone number, rating, driving time, walking time are displayed in this example, along with the update time indicating when the data was last updated.

As another example, FIG. **17***c* depicts a place view that presents an intersection near 474 March Rd for the purposes of providing a traffic update. When launching a traffic application using the place "near 474 March Rd", the device identifies an intersection where there is a traffic alert, construction or road condition update.

In addition to the contacts, local search and traffic examples presented in FIG. **17***a*-**17***c*, many other applications may require place data such as, but not limited to, a calendar, e-mail, instant messaging (e.g. BBM), MMS, navigation, travel, maps, and various social network applications, etc.

Any of the methods disclosed herein may be implemented in hardware, software, firmware or any combination thereof. Where implemented as software, the method steps, acts or operations may be programmed or coded as computer-readable instructions and recorded electronically, magnetically or optically on a fixed or non-transitory computer-readable medium, computer-readable memory, machine-readable memory or computer program product. In other words, the computer-readable memory or computer-readable medium comprises instructions in code which when loaded into a memory and executed on a processor of a computing device cause the computing device to perform one or more of the foregoing method(s).

A computer-readable medium can be any means that contain, store, communicate, propagate or transport the program for use by or in connection with the instruction execution system, apparatus or device. The computer-readable medium may be electronic, magnetic, optical, electromagnetic, infrared or any semiconductor system or device. For example, computer executable code to perform the methods disclosed herein may be tangibly recorded on a computer-readable medium including, but not limited to, a floppy-disk, a CD-ROM, a DVD, RAM, ROM, EPROM, Flash Memory or any suitable memory card, etc. The method may also be implemented in hardware. A hardware implementation might employ discrete logic circuits having logic gates for implementing logic functions on data signals, an application-specific integrated circuit (ASIC) having appropriate combinational logic gates, a programmable gate array (PGA), a field programmable gate array (FPGA), etc.

This invention has been described in terms of specific embodiments, implementations and configurations which are intended to be exemplary only. Persons of ordinary skill in the art will appreciate, having read this disclosure, that many obvious variations, modifications and refinements may be made without departing from the inventive concept(s) presented herein. The scope of the exclusive right sought by the Applicant(s) is therefore intended to be limited solely by the appended claims.

The invention claimed is:

1. A method of managing place data for a wireless device, the method comprising:

receiving place data for place-related content from a plurality of applications executable on the wireless device;

storing the place data received from the applications of the wireless device in a place data store in a memory of the wireless device, the place data store storing the place data for each of a plurality of places;

in response to a place data request from any one of the plurality of applications of the wireless device, providing the place data from the place data store to the one application, wherein all place data requests from the applications of the wireless device are communicated to the place data store; and

monitoring, by the wireless device, usage of the place data of a place while the wireless device is located at the place;

deriving contextual information about the place and personal preferences of a user of the wireless device with respect to the place; and

integrating the contextual information as additional place-related content in the place data store.

2. The method of claim **1** wherein each place comprises a physical location or a virtual location.

3. The method as claimed in claim **2** wherein storing place data in the place data store comprises storing, for each place:

a place tag identifying the place; and

location coordinates for the physical location or a user-specified virtual location descriptor that identifies the virtual location to the user.

4. The method as claimed in claim **1** wherein providing the place data store comprises storing, for each place:

a data identifier that identifies an application associated with the place data.

5. The method as claimed in claim **1** wherein storing place data in the place data store comprises storing, for each place:

a set of rules specifying how the data is to be shared, accessed, persisted or visually presented.

6. The method as claimed in claim **1** wherein storing place data in the place data store comprises storing data that includes, for each place:

a set of relationships identifying places, persons or events related to the place.

7. The method as claimed in claim **1** wherein the place data comprises, for each place, one or more of:

a data identifier that identifies an application associated with the place data;

an expiry date;

a set of rules specifying how the data is to be shared, accessed, persisted or visually presented;

a set of actions to be performed at the place; and

a set of relationships identifying persons, places and events related to the place.

8. The method as claimed in claim 1 further comprising:
registering an application for proximity notification;
if the wireless device is within a predetermined proximity of a place, providing a proximity notification to the application.

9. The method as claimed in claim 1, wherein place data is associated with at least one application selected from the group comprising: a mapping application; a communication application; a contacts application; a calendar application; a task managing application; and a third party application.

10. The method as claimed in claim 1, wherein place data is obtained from a first application selected from the group comprising: a mapping application; a communication application; a contacts application; a calendar application; a task managing application; and a third party application, and is accessible to other applications in the group.

11. A non-transitory computer-readable medium comprising instructions in code which when loaded into a memory and executed by a processor of a wireless device cause the wireless device to:
receive place data for place-related content from a plurality of applications executable on the wireless device;
store the place data received from the applications of the wireless device in a place data store in a memory of the wireless device, the place data store storing the place data for each of a plurality of places;
in response to a place data request from any one of the plurality of applications of the wireless device, provide the place data from the place data store to the one application, wherein all place data requests from the applications of the wireless device are communicated to the place data store
monitor, by the wireless device, usage of the place data of a place while the wireless device is located at the place;
derive contextual information about the place and personal preferences of a user of the wireless device with respect to the place; and
integrate the contextual information as additional place-related content in the place data store.

12. The computer-readable medium as claimed in claim 11 wherein each place comprises a physical location or a virtual location.

13. The computer-readable medium as claimed in claim 12 comprising code to store for each place:
a place tag identifying the place; and
location coordinates for the physical location or a user-specified virtual location descriptor that identifies the virtual location to the user.

14. The computer-readable medium as claimed in claim 13 comprising code for storing data that includes, for each place:
a set of relationships identifying contacts related to the place.

15. The computer-readable medium as claimed in claim 11 comprising code for storing, for each place:
a data identifier that identifies an application associated with the place data; and
a set of rules specifying how the data is to be shared, accessed, persisted or visually presented.

16. The computer-readable medium as claimed in claim 11, wherein place data is associated with at least one application selected from the group comprising: a mapping application; a communication application; a contacts application; a calendar application; a task managing application; and a third party application.

17. The computer-readable medium as claimed in claim 11, wherein place data is obtained from a first application selected from the group comprising: a mapping application; a communication application; a contacts application; a calendar application; a task managing application; and a third party application, and is accessible to other applications in the group.

18. A wireless device comprising:
a position-determining subsystem for determining a position of the wireless device;
a memory storing place data for place-related content for the wireless device in a place data store for each of a plurality of places, wherein the place data is received from a plurality of applications executable on the wireless device;
a processor operatively coupled to the memory for executing at least one of the plurality of applications, to determine when place data is required for the one application, and to obtain the place data required for the one application from the place data store, wherein all place data requests from the applications of the wireless device are communicated to the place data store;
wherein the processor is further configured to:
monitor, by the wireless device, usage of the place data of a place while the wireless device is located at the place;
derive contextual information about the place and personal preferences of a user of the wireless device with respect to the place; and
integrate the contextual information as additional place-related content in the place data store.

19. The wireless device as claimed in claim 18 wherein each place comprises a physical location or a virtual location.

20. The wireless device as claimed in claim 19 wherein the place data store comprises, for each place:
a place tag identifying the place; and
location coordinates for the physical location or a user-specified virtual location descriptor that identifies the virtual location to the user.

21. The wireless device as claimed in claim 18 wherein the place data store comprises, for each place:
a set of rules specifying how the data is to be shared, accessed, persisted or visually presented.

22. The wireless device as claimed in claim 18 wherein the place data store comprises data that includes, for each place:
a set of relationships identifying persons, places and events related to the place.

23. The wireless device as claimed in claim 18 wherein the place data store comprises, for each place:
an expiry date; and
a set of actions to be performed at the place.

24. The wireless device as claimed in claim 18 wherein the place data store comprises data from removable data sources when connected to the wireless device.

25. The wireless device as claimed in claim 18, wherein place data is associated with at least one application selected from the group comprising: a mapping application; a communication application; a contacts application; a calendar application; a task managing application; and a third party application.

26. The wireless device as claimed in claim 18, wherein place data is obtained from a first application selected from the group comprising: a mapping application; a communication application; a contacts application; a calendar application; a task managing application; and a third party application, and is accessible to other applications in the group.

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